REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

Attached hereto is a marked-up version of the changes made to the application by the present Amendment.

In response to the Patent Drawing Review, attached hereto are proposed formal drawings for the Examiner's approval.

The claims have been amended to remove the minor formal defects noted by the Examiner in the Office action. Reconsideration of the application in its current form is requested.

It is initially noted that the present invention is directed toward a method and device for joining a porous material, such as wood, by using a joining element made from a thermoplastic material. Energy is applied to the thermoplastic material such that the thermoplastic material flows into the pores of the porous material, thereby forming a macroscopic internal anchoring connection between the porous material and the joining element. It is respectfully submitted that the present invention is not shown or described in the art of record.

Claims 23-29 and 31-47 stand rejected as being anticipated or obvious over Eakins or Luth or Hirakawa.

Eakins teaches a plastic rivet device and method whereby two substrates that have an aligned through bore may be affixed to one another. The plastic rivet has an enlarged head formed on opposite ends thereof to pin the substrates to one another. Luth discloses a substantially identical method and device.

It is respectfully submitted that neither Eakins nor Luth disclose or suggest the claimed method and device. For example, with reference to claim 23, neither Eakins nor Luth teach

> forming a bore in the component with the bore having an inner closed end so that the joining element can be inserted into a first position in the bore with substantially no force

Rather, both Eakins and Luth teach forming through bores, rather than the "blind bore" of the present invention.

With continued reference to claim 23, neither Eakins nor Luth teach

> applying pressure to force the element into a second, position in the bore, the pressure being applied substantially along a central axis of the bore and producing an increase of pressure at the preselected anchoring point between the joining element and the bore

Rather, both of these references teach applying pressure to the end of the plastic rivet to cause the ends of the rivet to "head-up".

Finally, with further continued reference to claim 23, neither Eakins nor Luth teach or suggest

> during the application of pressure, applying energy to the joining element to cause the thermoplastic to plasticize at the preselected anchoring point, the pressure causing the plasticized thermoplastic material to flow into pores of the part adjacent the bore, thereby forming a macroscopic anchoring connection between the part and the joining element

It is considered apparent that neither of these references teaches the application of pressure coincident with the application of energy to cause the flow of plasticized thermoplastic (i.e., into pores of the part adjacent the bore) and neither teach forming a macroscopic anchoring connection between the part and the joining element. The joining element defined in claims 36-46 is also patentable over the Eakins and Luth references. Accordingly, it is respectfully submitted that neither of the Eakins nor Luth references anticipates nor renders obvious the claimed invention. Reconsideration and withdrawal of the rejections based upon the Eakins and

Luth patents is requested.

With reference to the Japanese Abstract - referred to by the Examiner, and hereinafter, as the Hirakawa reference, it is noted that this references is directed toward a method of joining a thermoplastic resin 2 with another material 3 by forming a through bore in the other material 3 that is aligned with a blind bore 4 in the thermoplastic resin 2. A thermoplastic headed pin 1 is inserted through the through-bore and into the blind bore such that the end of the headed pin engages the thermoplastic resin at the end of the blind bore and the head is in interference fit with the other material. External energy is applied to the headed pin so that at least the end of the pin is fused to the thermoplastic resin 2 to hold the other material thereon.

Accordingly, the Hirakawa reference teaches a completely different method than that of the presently claimed invention. For example, Hirakawa does not teach or suggest

> applying pressure to force the element into a second, deeper position in the bore, the pressure being applied substantially along a central axis of the bore and producing an increase of pressure at the preselected anchoring point between the joining element and walls of the bore

In this regard it is noted that Hirakawa does not teach applying a force against the element to force the element into a second position within the bore (i.e., to compress the element). Moreover, and further in this regard, Hirakawa does not teach or suggest

> during the application of pressure, applying energy to the joining element to cause the thermoplastic to plasticize at the preselected anchoring point, the pressure causing the plasticized thermoplastic material to flow into pores of the part adjacent the bore, thereby forming a macroscopic anchoring connection between the part and the joining element

Rather, Hirakawa merely teaches that the thermoplastic material 2 and the end of the headed pin 1 melt or fuse together. The thermoplastic material will not provide any pores into which the plasticized thermoplastic pin will flow to form an anchoring connection. Moreover, there is no pressure formed in the Hirakawa method, so pressure cannot cause any flow of plasticized thermoplastic material of the joining element. In this regard it is considered important that

Hirakawa, like Luth and Eakins, is entirely concerned with joining non-porous substrates and, as such, is not considered particularly relevant to the present invention. Reconsideration of the rejections based upon each of these references is requested.

Finally, claim 30 stands rejected as being obvious in light of Eakins or Luth or Hirakawa in view of Fusco et al. Fusco is cited for teaching application of UV radiation to heat a thermoplastic material. Insofar as Fusco does not remove the deficiencies of the base references, set forth hereinbefore, it is respectfully submitted that the combination of Fusco with such base references does not establish a prima facie case of obviousness. Reconsideration and withdrawal of the rejections based upon the combination of Fusco with any other reference is requested.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. FRR-32641.

Respectfully submitted,

RANKIN, HILL, PORTER & CLARK LLP

By: _____
David E. Spaw, Reg. No. 34732

700 Huntington Building
925 Euclid Avenue
Cleveland, Ohio 44115-1405
(216) 566-9700
Customer No. 007609

Attachment: Marked-up version of Amendments

Marked-up Version of Amendment

IN THE CLAIMS:

The claims have been amended as follows:

23. (amended) A method for anchoring a joining element ~~[(3, 3.1,...3.4) in a part (1) comprising a porous material having cavities or in which cavities can be produced by pressure]~~ in a part consisting of porous material, the joining element including a thermoplastic material at least at the location of a preselected anchoring point, the method comprising the steps of:

forming a bore in the part~~[(1)]~~, the bore having an inner closed end and being matched to the shape and dimensions of the joining element so that the joining element can be inserted into a first position in the bore with substantially no force,

positioning the joining element in the bore in the first position,

applying pressure to force the ~~[bore]~~ element into a second, deeper position in the bore, the pressure being applied substantially along a central axis of the bore and producing an increase of pressure at the preselected anchoring point ~~[(31, 33)]~~ between the joining element and walls of the bore,

during the application of pressure, applying energy to the joining element to cause the thermoplastic to plasticize at the preselected anchoring point, the pressure causing the plasticized thermoplastic material to flow into pores ~~[or cavities]~~ of the part ~~[(1)]~~ adjacent the bore, thereby forming a macroscopic anchoring connection between the part and the joining element.

26. (amended) A method according to claim 23 including joining a second part ~~[(2)]~~ made of a porous material to the first mentioned part ~~[(1)]~~ with the joining element, wherein the joining element is a joining pin having a reduction in diameter intermediate the ends thereof forming a shoulder, wherein the step of forming a bore includes forming a portion of the bore through the second part and into the first part to an inner closed end, the bore in the second part having a reduction in diameter matching the reduction in diameter of the joining pin, and the step of positioning includes inserting the joining pin into the first and second parts with the shoulders of the joining pin and bore in contact to define the first position, the

contacting shoulders forming a second macroscopic connection between the second part and the joining element.

27. (amended) A method according to claim 23 including joining a second part ~~[(2)]~~ made of a porous material to the first mentioned part ~~[(1)]~~ with the joining element, wherein the joining element is a joining pin, wherein the step of forming a bore includes forming a portion of the bore through the second part and into the first part to an inner closed end, and wherein the joining pin has an enlarged head portion on an outer end thereof.

33. (amended) A method according to claim 23 wherein the part ~~[(1,2.2)]~~ comprises wood or a woodlike material.

35. (amended) A method for anchoring a joining element ~~[(3, 3.1, ...3.4)]~~ in a structural component having a cavity or in which a cavity can be produced by pressure, the joining element including a thermoplastic material at least at the location of a preselected anchoring point, the method comprising the steps of:

forming a bore in the component ~~[(1)]~~ with the bore having an inner closed end so that the joining element can be inserted into a first position in the bore with substantially no force,

positioning the joining element in the bore in the first position,

applying pressure to force the element [bore] into a second, position in the bore, the pressure being applied substantially along a central axis of the bore and producing an increase of pressure at the preselected anchoring point between the joining element and the bore,

during the application of pressure, applying energy to the joining element to cause the thermoplastic material to plasticize at the preselected anchoring point, the pressure causing the plasticized thermoplastic material to flow into one or more cavities of the component~~[(1)]~~, thereby forming a macroscopic anchoring connection between the component and the joining element.